TECHNICAL MEMORANDUM NO. 1

ADDENDUM TO FINAL PHASE 1 RFI/RI WORK PLAN

ROCKY FLATS PLANT WALNUT CREEK PRIORITY DRAINAGE OPERABLE UNIT NO. 6 (OU 6)

> U.S. DEPARTMENT OF ENERGY ROCKY FLATS PLANT GOLDEN, COLORADO

ENVIRONMENTAL RESTORATION PROGRAM

December, 1992

REVIOUED FOR DEADSIFICATION/UCAN

One //2/23 Cause

ADMIN RECORD

A-0U06-000067

SUMMARY OF BORINGS NEAR PONDS Table 1

POND	POND BOTTOM ELEVATION (ft)	BOTTOM OF BORING (ft)	BORING INTERVAL BEYOND BOTTOM OF POND (ft)	BORING ID
A - 1	5823	5822	1 .	13-86
A-2	5799	5791	8	40991
A-3	5776	5762 5759 5750 5758 5749	1 4 1 7 2 6 1 8 2 7	12-86 TH046192 TH046292 TH046392 TH046492
A - 4	5731	5697 5707 5714	3 4 2 4 1 7	11-86 41091 38-86
B - 1	5875	5872 5853 5849 5852	3 22 26 23	36-86 TH046592 TH046692 TH046792
B-2	5860	N/A	-	-
B-3	5846	5830 5825 5822	16 21 24	TH046892 TH046992 TH047092
B - 4	5833	N/A	-	-
B - 5	5773	5779	- 6	37-86

Data for the above table were obtained from: Work Plan for Geotechnical Analysis of Earthen Dams B-1. B-2. A-3 and Landfill Dam, EG&G Rocky Flats, July 29, 1992 and Geologic Characterization Report, Appendix G, EG&G Rocky Flats, September 1992.

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3.0 ALLUVIAL MONITORING WELLS

A single alluvial monitoring well will be installed immediately down stream of each dam at ponds A-4 and B-5 as opposed to the two that are specified for each dam in Section 7.2.2 Stage 3 of the Work Plan. Two wells would provide redundant sampling of groundwater.

The two wells would be in the same drainage and would likely be drilled through the same lithology. Groundwater samples would be obtained from the same aquifer in essentially the same area.

A bedrock monitoring well will be nested with the single alluvial well if sandstone is encountered within the first bedrock unit, as required in the Work Plan. The wells will be installed as specified in the Work Plan.

4.0 AMBIENT AIR MONITORING STATIONS

The three proposed ambient air samplers specified in Section 7.2.9 of the Work Plan are deleted. Short term and worker protection air sampling will be performed as indicated in the Plan for Prevention of Contaminant Dispersion (PPCD) and site specific health and safety plans.

Baseline ambient data for this OU will be obtained from the existing plant site Radiological Ambient Air Monitoring Program (RAAMP), which includes samplers in the Walnut Creek drainage and units at downwind locations S-35, S-36, S-37, S-38, and S-39 (Figure 2). In addition to the RFP sampling effort, CDH operates ambient air samplers in the vicinity of this OU and at downwind locations (D-5, D-6, E-2 and E-3, X-1 and X-2). Data from these sources will be used to evaluate the radioactive ambient emissions and perform an air pathway analysis.

5.0 SURFACE WATER SAMPLING ALONG STREAMS

Surface water and sediment sampling stations selected jointly by EG&G, DOE-RFO, CDH, and USEPA in a field reconnaissance meeting will replace those specified or implied in the Work Plan for IHSS142. The sampling stations will be located at positions along the Walnut Creek drainage and at positions immediately downstream from significant tributaries. By

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Well Logs

1.0 INTRODUCTION

The Purpose of this Technical Memorandum is to eliminate unnecessary effort presently specified in the Interagency Agreement (IAG) and/or the OU 6 Work Plan. Additionally, surface water sampling along streams and surface water flow measurements at gauging stations are proposed to enhance the Human Health Risk Assessment and contaminant fate and transport modeling which will be provided in the RFI/RI report

2.0 BEDROCK MONITORING WELLS

The five bedrock monitoring wells specified in Section 7.2.2 Stage 3 - Monitoring Wells, OU 6 Work Plan are to be deleted. The alluvium and bedrock in the vicinity of the ponds have been adequately characterized by ten borings and monitoring wells along the A series ponds and by eight borings and monitoring wells along the B series ponds (Figure 1).

Examination of the well logs in the Appendix shows occurrence of discontinuous sand lenses scattered among 7 of the 18 borings and monitoring wells. Of those seven occurrences of sand lenses, monitoring wells intersect five. Sands were logged in borings TH046792 and TH046892 but did not occur in four adjacent borings (two near each location). Each sand lense that has been encountered has several, or all of the following attributes:

Minimal thickness Very fined grained with a high clay content Overlain by clay Discontinuous

Information in Table 1 show that the 18 existing borings—and monitoring wells have penetrated to a sufficient depth below the ponds to provide data for the evaluation of the sediments and bedrock beneath the ponds. Although ponds B-2 and B-4 do not have borings immediately adjacent; three borings near B-1 extend from seven to eleven feet below B-2 and three borings near B-3 extend three to eleven feet below B-4.

sampling major tributaries to Walnut Creek and locations where the tributary water is mixed with the main stream water, contaminant loading through the Walnut Creek drainage will be readily quantified. The surface water quality and discharge data collected at each station will be used to identify stream segments where contaminants potentially are loaded into Walnut Creek.

The selected sampling stations are either presently monitored under existing storm water monitoring programs or were once part of the site-wide monitoring program. The site-wide monitoring program provided data for assessing the nature and extent of contamination in surface water and sediments at the RFP, but fate and transport were not addressed.

The approach to the entire OU6 surface-water and sediment investigation is to quantify physical and chemical processes by which potential contaminants are transported through the Walnut Creek watershed. The results of this mechanistic study will provide a data set and corresponding interpretation for risk assessment.

To adequately characterize the Walnut Creek Drainage, surfacé water samples will be obtained concurrently with sediment samples from the streams and at gauging stations shown on Figure 3. Contemporaneous flow measurements, and aquatic toxicity samples will also be obtained.

One sediment sampling event and two water sampling events will take place. One of the water sampling events will be during base flow conditions in the areas where flowing water can be measured and sampled. The second water sampling event will take place during a storm event or substantial snow melt of sufficient magnitude to provide measurable runoff. The sediment sampling event will be performed during the base flow conditions.

Surface water and sediment sampling will be performed according to EMD Operational Procedures Manual No. 5-21000-OPS-SW Volume IV: Surface Water. The sampling locations and the data to be acquired are summarized in Table 2.

Walnut Creek Characterization Data Acquisition Table 2

Station ID	Flow Measurement	Water Chemistry	Sediment Chemistry	Aquatic <u>Toxicity</u>
SW116	SB	SB	В	В
SW118	SB	SB	В	В
SW093	SB	SB	В	В
GS13	SB	SB	В	В
SW091B	SB	SB	В	В
GS12	SB	SB	В	В
GS11	SB ,	SB	В	В
GS03	SB	SB	В	В
GS09	SB	SB	В	В
GS10	SB	SB	В	В
SW103	В	В	В	В
SW022	SB	SB	В	В
# 1	SB	SB	В	В
# 2	SB	SB	В	В
# 3	SB	SB	В	В

S = Storm event or pond discharge event sampling.

B = Base flow sampling if sufficient water exists.

The water toxicity samples will be collected during base flow conditions to avoid the concentrations of dissolved minerals, elements and deposited air borne urban pollutants associated with storm water runoff.

The water and sediment samples will be analyzed according to Table 7-11 of the Work Plan following the EG&G General Radiochemistry and Routine Analytical Services Protocol (GRAASP). In order to augment the toxicity data, water samples will also be analyzed for the following parameters according to GRAASP:

Dissolved Organic Carbon Alkalinity Sulfate 3

Chloride Bicarbonate Silicon

Toxicity Screens will be performed according to <u>Methods for Measuring</u> the Acute Toxicity of Effluent to Freshwater and Marine Organisms, USEPA 600/4-85/013, March 1985 and <u>Requirements for Whole Effluent Toxicity Testing</u>, EG&G Rocky Flats, EMD, September 1992.

6.0 RADIATION SURVEY

The OU 6 Work Plan requires that a radiation survey be performed over IHSS 165, the Triangle Area (Figure 7-1 of the Work Plan). The radiation survey will be limited to the eastern most portion of the IHSS which is located east of the PSZ fence where the soil is not covered with gravel.

The remainder of IHSS 165 is covered with gravel. The gravel has been compacted and there are no noticeable voids within the covered area. Compacted gravel of minimal thickness forms an effective barrier to gamma radiation. Therefore, a radiation survey over the gravel covered area would be futile and costly.

IHSS 165 has had radionuclide contaminated soil excavated and removed from the area. The last known excavation of contaminated soil in IHSS 165 occurred during 1973 and perhaps 1974. A radiation survey (FIDLER) performed in April 1975 indicated no hot spots and no contaminated soil (Historical Release Report, June 1992).

The gravel was placed sometime after 1978. A FIDLER survey on a 100 foot grid, performed over the gravel for the purpose of clearing the soil gas survey probe locations, was performed during October 1992. The survey showed no radioactivity above background. Because of the contaminated soil removal (and implied placement of uncontaminated fill), the gravel covering, and the negative results of the radiation surveys, it is doubtful that an additional radiation survey would provide evidence of surficial radiation.

The potential for radiation contamination beneath the gravel, and outside

of the excavated areas will be addressed by sampling from four random soil cores and nine soil borings as specified in the Work Plan. Although the nine soil borings will be located based upon the results of the soil gas survey; the contaminants were mixed waste and likely followed similar paths.

The Work Plan specifies that six to fifteen surface soil samples be collected. To supplant the lack of a radiation survey, fifteen samples will be collected at random grid nodes of a 70 foot grid over the portions of the IHSS that are outside of the Protected Security Zone (PSZ). The 70 foot grid cell size is estimated to provide approximately 50 grid nodes on which the fifteen soil sample locations will be randomly distributed. The soil samples will be obtained from native soil beneath the gravel and/or identifiable fill material. The samples will be collected according to SOP GT.08 and analyzed as specified in Table 7-11 of the Work Plan.

7.0 ALTERNATE RADIATION SURVEY INSTRUMENT

Presently the Work Plan specifies that an HPGe instrument be used for all the radiation surveys. The HPGe is a replacement for the FIDLER instrument originally specified. Although the HPGe is the preferred instrument it may be necessary to substitute the FIDLER instrument to avoid delays. In the event that the FIDLER instrument be used the grid spacing will be reduced to 25 feet. Either instrument will provide the Level 2 EPA data quality objectives.

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APPENDIX

Boring and Monitoring Well Logs

IBER		1	RTH: St:	753323 209003 Oh Sten	} 5	AR	ITAL DEPTH (FT EA: BUFFER EAS CATOR NUMBER:	Ī	CA	OUND ELEVATION (FT): SING DIAMETER (IN): ECHOLE DIAMETER (IN):	5712.19 2 IO 7.5	PROJECT NUMBER: GEOLOGIST:- DATE DRILLED:	667.11 DCB 9/05/86	LOG OF BORING NUMBER:
SAMPLE NUMBER	g g	AMPLE RAIN SIZE	PERCENT		RECOVERY/ INTERVAL	OATUM(FT)	NE PILZ CORS	L OR Oneter Ruction	LITHOLOGY	UNIFIED SOILS OLASSIFICATION OR ROOK TYPE	OCSCRIPTION			
		50x 100	, E	2	R	5711 5712	SON DE ON DE DESTREE		000000000000000000000000000000000000000	CH:	Clay, pale bro	ып, (SYR 5/2), hiç	h plasticity,	some silt and roots.
				1	/1	5710	2 2			<u>GC</u> :	Clayey Gravel, sub-angular, m roots	dominantly light oderately graded,	grey (N7), mai max. size, 4 d	trix is pale brown (SYR 5/2) cm., some silt, trace of
					3 14.2	sors sors sors s	3			GC:	1 cobble, very NOTE: Lithology	light gray (M7), y is interred.	rounded, appro	ox. 7 cm. diom.
				0.	8.00.8	8 - 80				CL:	GRAVELLY CLAY, lest), some si	dark yellowish brilt, trace of sand	онп (10YR 4/2)	, moderate to low plasticit
				0	<i>1</i> 0.5	0 -0				NO SAMPLE:				
				0.	5 /1	57°2 60'5				CL:	CLAY, dork yell color grades to	owish brown (10YR yellowish grey (4/2) moderate 5 YR 7/2) belo	plosticity, some silt, ж95ft
				0.5	5 /0.5					CLAYSTONE	Top of Bedrock Dork yellowish	brown (10YR 4/2)	noderate plast	ricity, some silt, color

TIONALE DE	STATE PLAN NORTH EAST: RENARKS:		} 35	AREA: BU	PTH (FT): 15 FER EAST NUMBER: R13	CAS	UND ELEVATION (FT) ING DIAMETER (IN): EHOLE DIAMETER (IN):	5712.19 2 IO 7.5	PROJECT NUMBER: GEOLOGIST:- Date Orilled:	667.11 DCB 9/05/86	LOG OF BORING NUMBER
SAMPLE NUMBER	SMPLE SMAIN SIZE		RECOVERY/ INTERVAL	DATUM (FT)	NELL OR PIEZONETER CONSTRUCTION	LITHOLOGY	UNIFIED SOILS CLASSIFICATION OR ROOX TYPE	DESCRIPTION	4-8-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-		
	SOX 100x 0	HHHHHH	0.5 /0.5	N 10 F			CLAYSTONE:	Same as above	lowish gray (5 YR 7.		
			1.5 /1	1072		7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	SILTY SANDSTONE:	Interval grade apparent, well sand, abundant	es to Silty Sondsto I weathered, modero t silt, iron stainii	ne, very ligh te to slightly ng both local	t gray (NB), bedding not of friable, very fine grained by and on fractures.
			1.5 /1.5	0 12 0 12			SILTY SANDSTONE:	Some as above			
).8 / 1	n 13 n 13		X	SILTY SANDSTONE:			,	
,		1	<i>n</i>	8695 LE		X	SILTY SANDSTONE:	Some os above. NOTE: No wate	r encountered while	e drilling.	1
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				5 17- 6 9 1							
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				m 19-1							

NUMBER	STATE PLANE COO NORTH- EAST: REMAPKS: HOTA	POINATE 752345 2087894 он Stem Auger	TOTAL DEPT APEA: BUFFI LOCATOR NO		CASI	O ELEVATION (FT) 16 DIAMETER (IN) 10LE DIAMETER (IN)	5777.88 2 ID 7 1/4	PROJECT NUMBER GEOLOGIST- DATE ORTILLED	667 11 LAA 09/06/86	LOG OF BORING NUMBER
SAMPLE NUME	SALT 1		DATUM(FT)	NELL OR Piezoteter Construction	I i hology	UNIFIED SOILS OLASSIFICATION OR ROOK TYPE	DESCRIPTION			
U	50. 100 0	111 17	-4-5 5455 5455 5455 5455 5455 5455 5455			CL	SILTY CLAY, o surficial gra	ork yellowish brown ss and root materia	[10 YR 4/2], Some VF to	est. plast. mod. Abundant fG sand.
		1912	5472 8472 5 3			CL:	SILTY GRAVELL Gravel angula spotty iron s	Y CLAY, dork yellow r to sub-rounded, m taining. More grav	ish brown (10 od. well grade el toward botti	YR 4/2), est. plast. mod. d, (1 cm to 5 cm), some om. Troce root moterial.
			5 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	BUZNE C		NO SAMPLE:				· · · · · · · · · · · · · · · · · · ·
		0 /1.7	6458 S7			CI.	01 7 1			
		0 /1.4	5 - 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5 -		2000	NO SAMPLE:	to 6.5 cm. s YR 5/4) Som	cannot determine i ub-angular to sub-ri e silt	gravet cotor. bunded. Matrix	Mod. well graded granules x mod. yellowish brown (10
		0.7 /0.6	5 0 7 5 8 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5							or to sub-angular. Poorly sh brown (10 YR 4/2). Some
		15 /2	5769		700 100 100 100 100 100	36	Llayey bravel, well graded plasticity mon	no predom gravel Granules to 6 cm d to high. Some s	cotor sub-or Matrix grayist It and sand Vi	ngular to rounded. Mod. h arange (10 YR 7/4). Est EG to VCG.
			0 10 10 10 10 10 10 10 10 10 10 10 10 10		1/2					

BER		TATE PLAN NORTI EAST MARKS	20	NATE 52345 087894 Stem Auger		TOTAL DEPT AREA BUFFE LOCATOR NU		CAS	DUMO ELEVATION (FT) SING DIAMETER (IN) REHOLE DIAMETER (IN)	5777 88 PROJECT NUMBER 667 11 LOS DE BORING NUMBER 2 ID GEOLOGIST- LAA 7 1/4 DATE ORTILLED: 09/06/86 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
SAMPLE NUMBER	SAPLE GRAIN SIZE	1000	PERCENT	RECOVERY/ INTERVAL	DATUR (FT)	0EPTH(FT)	HELL OR Piezoneter Construction	LITHOLOGY	UNIFIED SOILS Classification Or rook type	DESCRIPTION		
CI	50%				1 4 /1 1 5 /2		5763 5764 5765 5766 5767	11-12-13-14-15-1			SILTY CLAYSTONE	Clayey Gravel, no predom. gravel color. sub-angular to rounded. Modwell graded. Granules to 6 cm. Matrix grayish arange (10 YR 7/4). Est plast mod., some silt and sand, VFG to VCG. Top of Bedrock Light alive gray (5 Y 6/1) to dark yellowish arange (10 YR 6/6). Est plast mod. Possible highly weathered claystone. Some iron staining.
					3758 S759 S760 S761 S762	18-						

102774 18ER	STAT	E PLANE I NORTH EAST: RKS: H	7518 2088	869	A) Li	DTAL DEPTH EA: SOLAR DCATOR NUT	PONO		CA	OUND ELEVATION (FT): SING DIAMCTER (IN): REHOLE DIAMCTER (IN):	5837.22 2 ID 7 1/4	PROJECT NUMBER GEOLOGISI: Date drilled:	667.11 DCB 09/20/06	LOG OF BORING NUMBER:
CAL SAMPLE NUMBER	SAMPLE GRAIN SIZE		RECOVERY	RECOVERY/ INTERVAL	DATUM (FT)		HELL OR PIEZOMETE Constructi	R On	LITHOLOGY	UNIFIED SOILS Olassification or rook type	DESCRIPTION			
	501			0.673	5828 5829 5830 5831 5832 5833 5835 5836 5837	The state of the s					Some as above	e. Two larger pebbl	es occur at ap sticity, some	silt, possibly highly

мвея	STATE PLA NORT EAST REMARKS		69 <i>0</i> 55	AREA: S Locato	EPTH (FT) 15.5 Olar Pond R number - N11	CAS	UND ELEVATION (FT) ING DIAMETER (IN): EHOLE DIAMETER (IN):	5837 .22 2 ID 7 1/4	PRIJECT NUMBER: GEOLOGIST: Date drilled:	667.11 DCB 08/20/86	LOG OF BORING NUMBER
SAMPLE NUMBER	SAVPLE GPAIN SIZE	PERCENT	RECOVERY/ INTERVAL	DATURIET) DEPTH(FT)	WELL OR Piezoneter Construction	LITHOLOGY	UNIFIED SOILS Classification or rock type	DESCRIPTION			
RAMAS	GPAIN SIZE SOI 1001		25/25	10 11 12 13 13 14 15 15 15 15 15 15 15 15 15 15 15 15 15	PILOTETR CONSTRUCTION	LINALOSI AND THE CONTRACT OF	OR ROOK TYPE CLAYSTONE:	Scare os obove.	sh brown (10 YR S staining locally.	5/9), moderate Silt fractio	plasticity, some increases at 13.0
				18- 18-						1	
				9 19 19 19 19 19 19 19 19 19 19 19 19 19	ert.						

1	ST: :	01NATE: 750397 2086819 v Stem Auger.	area: ea: Locator	PTH (FT): 10 2 St trenches Number: N10		GROUND ELEVATION (FT): CASING DIAMETER (IN): BOREHOLE DIAMETER (IN):	5881 94 2 ID 7.25	PROJECT MUBER: GEOLOGIST: Date drilled:	667.11 DAT 08/25/86	LOG OF BORING NUMBER:
SAMPLE GPAIN SIZE	PERCENT RECOVERY	RECOVERY/ INTERVAL	DATUM(FT) DEPTH(FT)	HELL OR Piezoheter Construction	LITHOLOG	UNIFIED SOILS Classification or rook type	DESCRIPTION			
501 100		0.3 /0.3				CH:	Sandy Clay, trace of gra	Pale yellowish brown vel, slightly calc	(10 YR 6/2),	mod-high plast, some roo
		1.8 /4	2862 cales edes e			CL:	SANDY CLAY, I brown (10 YR trace of gra 2 in. with al top part of	pulticolored- gray (N 5/4), Light gray (N vel increasing to so pundant iron staining interval.	n brown (5 YR 3), mod. plost ne gravel at b g and concreti	3/21, moderate yellowish , some calc material, attom of interval, bottom ons, some iron staining in
			8485			CL:	Some as above	; Floury texture.	-	
		0.3 /1	5877					,		
		0.25 /0.2	1			CL: CLAYSTONE:	Same as above Top of Bedroc			
		2.9 R.2	58785 S488				iron staining	ray (5 Y 8/1), est as mottles, trace o	nod. plast., s Fsand.	some calc. material, some
		0.8 /0.3	28 %					slightly calcitic.	(8/1) some s	! !!! some VFG sand flour
		1.6 /1.2	5 B B B B B B B B B B B B B B B B B B B				texture, incre	eased iron staining.	,	ilt, some VFG sand, flour
The state of the s		1.4 /1	2 10 10 10 10 10 10 10 10 10 10 10 10 10			CLAYSTONE:	Same as above	•		

18ER		EAST: 20	NATE: 0397 186819 Stem Auger.	area: Locato	OEPTH (FT): 10.2 East trenches Ir number: N10	CAS	NO ELEVATION (FT): ING OIAMETER (IN): HOLE DIAMETER (IN):	5881 94 2 IO 7.25	PROJECT NUTBER: GEOLOGIST:. DATE DRILLED:	667.11 DAT 08/25/86	LOG OF BORING NUMBER:
SAMPLE NUMBER	SAMPLE Grain Size Sox	TO TO THE T	RECOVERY/ INTERVAL	OCPTH(FT)	LELL OR PILIZONETER CONSTRUCTION	LITHOLOGY	UNIFIED SOILS CLASSIFICATION OR ROOK TYPE	DESCRIPTION			
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£3		PLANE CO NORTH: EAST: CS: Hol	75156: 208886 20886	3 62	ARI	TAL DEPTH (F CA: BUFFER EA CATOR MUNDER	ST	CF	OUND ELEVATION (FT): SING DIAMETER (IN): REHOLE DIAMETER (IN):	5792 02 2 ID 7.5	PROJECT MUMBER: Geologist: Date drilled:	667.11 LAA 09/22/86	LOG OF BORING NUMBER:
SAMPLE NUMBER	SWPLE SPAIN SIZE SCIX 1	PERCENT	RECOVERY	RECOVERY/ INTERVAL	COATUR(FT)	H PII COKS	11 OR Poycier Truction	LITHOLOGY	UNIFIED SOILS OLASSIFICATION OR ROOK TIPE	OCSCRIPTION			
	344 1	an a	1	1.85 <i>1</i> 2	5791 579			Os De	CH:	Silty Clay, p high, some ro	ale yellowish brown ots and grass, trac	(10 YR 6/2), e gravel, gran	Est. plast. mod. to sule size.
			1	. 75./1	5790				CL:	Some os above, 2/2). Troce i	, with color change roots.	to dusky yell	owish brown (10 YR
			0.	.2 /1	n -c							,	modhigh, some sand :
			2.	3 n	8 7 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8				CL:	SANDY CLAY, of 6/6). Mottling 3.5cm, trace C	live gray (5 Y 4/1) a. Est. plast. mod. aco3.	and dark yelli , sand VFG to	oxish orange (10 YR CG, Trace gravel to
					ນ 6 0 (ຄ				CL:	Some as above,	lg. piece of grave	1 6.5cm.	
				8 /0.5	ທ © 7 ເ				CLAYSTONE :	Top of Bedrock			·
					n r m 8				SLAYSTONE:	Top of Bedrock Some as above, Some as above, Some as above,	some CaCO3.		1
			0.9	312	0 9 10 9								

		ite plane (north: East: Iarks: H	7515 2089	563	APE Loc	AL DEPTH (FT): 13 A: Buffer East Ator Number: P11	CA:	NAVO ELEVATION (FT): SING DIAMETER (IN): EHOLE DIAMETER (IN):	5752 02 2 ID 7.5	PROJECT NUMBER GEOLOGIST:- Date drilled:	667.11 LAA 09/22/86	LOG OF BORING NUMBER
	SWPLE Grain Size		RECOVERY	RECOVERY/ INTERVAL	2DATURIET)	HELL OR PIEZONETER CONSTRUCTION	LITHOLOGY	UNIFIED SOILS OLASSIFICATION OR ROCK TYPE	DCSCRIPTION			
OX	SOIL			0.65 12	19 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			CLAYSTONE:		ay (5 Y 8/1), Est. p		
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BCR		EAST: 20	2163 186298	AREA: SIT Locator	NUMBER: 012	CASI Bore	NO ELEVATION (FT) ING DIAMETER (IN): EHOLE DIAMETER (IN): ASCO Geologist, R.T.	5301, 19 2, 0, 1, 0 7, 25 Carvon	PROJECT MUMBER: GEOLOGIST Date drilled	SITEHIDE 6. Grigsby 11/11/91	LOG OF BORING NUMBER
SAMPLE NUMBER	SAMPLE GRAIN SIZE	PERC	RECOVERY/ INTERVAL	DATUM (FT)	VELL DR Piezoneter Construction	LITHOLOGY	UNITIED SOILS CLASSIFICATION OR ROCK TIPE	ESCRIPTION			
0121FB 0122FB	SOX	1007 65	1.00 17.00	sebo sea			SC	or gruvel, Jix	th some Gravel and ky yellowish brown in (10 YR 5/4) mott Gravel small, pr ind pred sub-angul Dry, weathered, s ent. S sand, 11% silt, 2	.ia ciuy.	
				0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			CL:	172 sond, 342	h some Sand. Dark asticity, poorly a granodiarite pebbl his interval. Dry silt, 49% clay	yellowish brow raded. Slightl e in sample. А y, weathered.	n (10 YR y calcareous. issumed
012 3 CB				86'7'8 8'4'8'8	2	ാറ്ററ്റ് റഹറ	NO SAMPLE: CL:	No recovery, I Silty Clay Hit vol 0.5° to 1	th some Sand. Some	as above (refe	erence inter-
***			1.20 /4.00	7 7 9 5 9 5 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5			GW:	Sandy Gravel N YR 7/4) to pal ly colcoreous, quartz, angulo kell graded fractions, sul oncular to sul	ith trace Silt and le yellowish brown low plasticity or to sub-angular, Sand pred. quartz o-angular. Finer forounded. Interva	JI ULY, NEULIELE	n orange (10 latrix slight- latrix slight- latrix and le 2.0 in., n coarser lyartz, sub-
	THE CHARLES AND THE PROPERTY OF THE CHARLES AND THE PROPERTY OF THE CHARLES AND THE CHARLES AN			n			NO SAMPLE	No recovery,	lost core.		
				2 6 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				Sandy Gravel i erence intervi 69% gravel, 3	with trace Silt and al 2.6' to 3.2') 5% sand, 3% silt, 2	IClay Same as Entire interval Aclay	above Iref- sieved.
1012SCB			3 20 73.50			00000 -//- //- //-	SILTY CLAYSTONE	Si'tty Claysto to Light olivi orange (mottl vels/oradatio	k at 7.4' (unconsol ne with some Sond e gray (5 Y 5/2) wi ing (fe staining) nol contacts. Care y damp. Sood y fe	Grayish orange ith some dark ye Some silty ‡o e mod. indurated	e (10 YR 7/4) ellowish sondy inter- d, mod. fri-
012EB				sers sers			CLAYEY SILISTON	E Clayey Siltst interval 7 0' Max porosity bedding	y damp. Sand v.f.(silt, 67% clay. one with some Sand to 8.8') with more estimated at 20% p	. Some as above e sand and dom.	reference Sitstone
001243			0.80 /0.60	‡:			NO SAMPLE	21% sond, 48% No recovery,	silt, 31% clay.		

18ER		1	ST 208	2163 96298	APEA Locat	DEPTH (FT) 10 1 SITEMIDE OR MATBER 012 e ASI Geologist,	CA BD	DUPO ELEVATION (FT) SING DIAMETER (DN) REHOLE DIAMETER (IN) BASCO Geologist, R T	5801 19 2 0 I D 7 25 Canon	PROJECT NUMBER Geologist Date Orilled	STIENIDE 6 GRIGSBY 11/11/91	LGS OF BORING NUMBER
SAMPLE MUMBER		SAPLE GRAIN SIZE	PERCENT	RECOVERY/ INTERVAL	DATURIET)	VELL OR Piezoncter Construction	LTIHOT OEA	UNIFIED SOILS OLASSIFICATION OR ROOK TYPE	DESCRIPTION			
	OX		0.00		10-			CLAYEY SILTSTON	E Clayey Silts interval 8.8 21% sand, 48 NOTE: 0.27	tone with some Sand ' to 9.2') K silt, 31% clay extra core recovery	Same as abov	ve (reference
					0 11- 0 11-				Total Ocille NOTE Total Botta Top of	d Depth = 10 1' Depth of Cosing = 9 n Depth of Filter Poo 16-40 sand Backfill	73' k = 10.1' = 10.1'	
		The second secon			ุก 12- - เก	٠			,			
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					2 19 8 4 5							
					20.	4						

	!	STATE PLANE			TOTAL DE	PTH (FT): 13.0		UND ELEVATION (FT):	5719.56	PROJECT NUMBER	SITENIDE	LOG OF BORING NUMBER:
		NORTH			APEA: SI			ING DIAMETER (IN):	2.0	GEOLOGIST:	F.G.	<i>/</i> 11001
		EAST:	2089			NUMBER: 013		EHOLE DINNETER (IN):		DATE DRILLED:	11/11/91	411141
Œ]	RENARKS	Hollow Ste	en Auger or	nd Rotary Cor	e Drill. ASI 6	ieologistfred 6r	igsby; EBASCO Geologi	ist, H.T. Conon.	ASI Log.		17077
RUMBE	L		- '	ہ ج	E E							
MPLE	SAYPLI Grajk		COVE	RECOVERY INTERVAL	DATUM(FT) DEPTH(FT)	HELL OR PIEZOMETER		UNIFIED SOILS CLASSIFICATION				
ò OI	S12T. 500%	1001_01	2 2 100X	ž A	à ä 	CONSTRUCTION	LITHOLOGY	OR ROOK TYPE	DESCRIPTION			
	1					7		SC:	Clayey Sand t	o Silty Sand with: 4/2) - Well graded is med plasticity ЮХ sand, 25% silt,	some Gravel. [lork yellowish
					67				DLOMU (IN IK	9721 Well grooed is med plasticity	. 0000 root as Orv weather	ed (sc-sm)
					57.29			1	20% gravel, 3	0% sond, 25% silt,	25% clay.	Cu. (50 Jii).
011308				1.20 /2.00	1-	a l	g	N:	Sandy Silt Ni	th some Clay. Dar	yellowish bro	жn (10 YR
									4/21', Non-co	th some Clay. Darl Ilcareous, med plas I. quartz, some fel	ticity. Sand f	`.g., sub-
					5718				ongular, pred roots.	1. quartz, some feli	ospor. Ury, we	eathered, some
					in \$	a l			35% sand, 40%	silt, 25% clay.		
אוונדה					2-5	g g	\$////	NO SAMPLE:	No recovery,	lost core.		
011573					4		3////	CL:	Silty Cloy N	th some Sand and to) YR 2/2). Gravel () in), poorly gra med. plasticity, so Interval damp, sl 15% sand, 25% silt,	race Gravel . [Dusky yellон-
011728					5717		<i>3////</i>		ish Brown III	I IX 2/21. brovel	pebbles sporse	but longe
					3-				Core dense. I	ed plasticity so	ne carbon. Nor	n-calcareous,
								1	non-friable.	Interval damp, sl	ightly weathers	ed.
					97.]	(5% gravel, 1	low sond, 25% silt,	oox clay.	•
					is ‡						,	
				2.70 /4.00	4			1			•	
					n 🖠		70/0/	1 16C:	Clovey Grave	with some Sound on	d trace Silt (c	ooor somole)
0011 1 38					7 2		122.2	1"	Poorly grader	l with some Sond on d, one (1) large pe n (5 YR 3/2), some	bble 12,25 in.	. Ylatrix
!					" <u>-</u>				grayish brown	n 15 TR 3/2), some Sample dry, жеаth	pale yellowish acad roo-frial	brown mottling
									nented.	Jumple u.y, Reutil	cicu, nun intu	טוב, אכוו נכ
					۲ ،					10% sond, 5% silt,	30% clay.	
					57.1			NO SAMPLE:	No recovery,			
					6			SC:	Clayey Sand	with some Gravel on Some very-clayey emented langilloceo Gravel fraction pr ub-rounded to sub-o some sub-rounded, thered	d Silt Dark y	yellowish brown
					C .			3	down well o	Some very-clayey emented loon.llocen	intervals, loi us) Mod frii	re dense, able med
					5713				plosticity	Gravel fraction pr	ed quartzite,	some granite
					7-				Fragnents, s	ub-rounded to sub-o	ngular Sand p	pred. f.g.,
									sub-angular, Slinhtly wen	SONE SUD-rounded, thered	prea. quartz.	Poorty groded.
	: 4				-H			3	+/-12% grove	1, 62% sand, +/-6%	silt, 20% clay	
					10 1				J		. !'	
				4.50 /4.00	8							
0011808								3				
					77			3				
					in 1			SC:	Clayey Sand	with some Silt. Do	rk yellowish b	rown (10 YR
					9-1				9/2) Sond	with some Silt. Do fg., sub-angular t d. Gravel at top o	o sub-rounded,	pred. quartz.
					0				terval annea	ru, oruveriut tubit rspenaeable Dhim	nod friable	ilica vul. IIIT . Tok to med.
					3710			3	plasticity,	rs permeable. Domp non-weathered (?) % silt. 36% clay.	,	,
001167B	: 1			3	lu }		:::\ <i>\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\</i>	A .	52% sand 12	A silt. 36% clay.		

18CR		STATE PLA NOR EAS REMARKS:	T: 208	1241 19994	ARE Loc	AL DEPTH (FT): 13 0 A: SITENIDE ATOR NUBER: 013 y Care Drill: ASI Ge	CAS Bor	NAD ELEVATION (FT) Sing diameter (in): Ehole diameter (in): Figsby; EBASCO Geologi	S719.56 PROJECT NUMBER STIENTOE LOG OF BORDAG NUMBER: 2 0 GEOLOGIBT: F.G. 7 25 DATE ORTHLED: 11/11/91 st, R.T. Conon. ASI Log
SAMPLE NUMBER	SAYP Grai Sizi		PERCENT RECOVERY	RECOVERY/ INTERVAL	DEPTH (FT)	LELL OR PER TAYLETER CONSTRUCTION	LITHOLOGY	UNITIED SOILS Classification or rook tipe	OCSCRIPTION
	501			0.80 /2.00	1 0 2 1			CLAYSTONE:	Top of Bedrock at 10.0' Claystone with some Silt and trace Sand. Pred. yellowish gray (5 Y 7/2), damp, mod. friable. Badly broken (drilling induced), mod. indurated. Trace sand, +/-15% silt, +/-85% clay.
					5708			NO SAMPLE:	No recovery, Tost core
				0.10 /1.00	.,	2-		CLAYSTONE:	Claystone with some Silt. Same as above (reference interval 10.0' to 10.8'). Trace of sand, +/-15% silt, +/-85% clay.
					9078	3		NO SAMPLE:	No recovery, lost core. Total Drilled Depth = 13.0'. NOTE: Total Depth of Casing = 12.3'. Bottom Depth of Filter Pack = 10.3'. Top of bentonite Bockfill = 10.3'.
į.						, , , ,			i.
						6-1			
					- 5 - 5 - 5 - 5 - 5	7-			4.4
					2 2 5 8	8 1 8 1			3
	The second secon				1072	9-			
		The first constraint of the fi			5700	200			

9651	STATE	EAST: 20	52826 090281	ARE LOC	AL DEPTH (FT): 14 A: BUFFER EAST CATOR NUMBER: R12 On TO to 13.0'.	CA	OUND ELEVATION (FT): SING DIAYETER (IN): REHOLE DIANETER (IN):	5728 .13 2 .10 1 .25	PPOLECT NUMBER: GEOLOGIST: Date orilled:	667.11 LAA 09/08/86	LOS OF BORING NUMBER:
Srm: cc 14Uh	SWPLE Grain Size	PERCENT RECOVER	RECOVERY/ INTERVAL	DATURIFT)	NELL OR PLEZOMETER CONSTRUCTION	LITHOLOGY	UNIFIED SOILS CLASSIFICATION OR ROOK TYPE	DESCRIPTION			
		101	1.6 17	srzz srze			CH	Slity Clay D present Toder	ark yellowish brow ately high plastic	n (10YR 4/2), city : Troce so	surface grass and roots nd
			0 /0 8	5726			NO SAYPLE:	.,			
			13712	5725			CL:	Some as above.	Less roots and gr	ross, some sub-	rounded gravel, up to 2ca.
				5721		10101 10101 10101	G:	Large cobbles to nediun gray natrix, nodera	and gravel in sand (NST: Angular to tely yelloxish bro	ly clay matrix. 1 sub-angular. 14n. (1018 5/4)	Gravel grayish red (10R 9 Moderately graded. Sondy Moderate plasticity.
			1.6 /2	5723		10/0/ 10/0/ 10/0/ 10/0/					
				5722			CLAYSTONE:	Top of Bedrock Dusky yellowis One large cobb	h brown (10YR 2 /2) le at top (7 cm.)	High plasti Some iron st	city, some silt, trace sand aining. Some thin
			1.8 /2	57.21	7-			CUI DOMOCEOUS 1	uyd 5.		
			0.2 /0.2	5720		7-7- 7-7- 7-7- 7-7-	1		brown (10YR 4/2). dding. Sone carbo	Highly weath noceous materi	ered. Slightly friable. al
			1.5 /1.2	871.9	9	7 - 7 - 7 - 7 - 7 - 7 - 7 - 7 - 7 - 7 -	SILIY CLAYSIONE				
			0.6 70.6			- / / / / / /	SILTY CLAYSTONE	: Some as above.			

	STATE PLANE COOPDINA NORTH: 7521 EAST: 2091 RENARKS: Hollow St	826 1281	IDIAL DEPTH (FT) 14 APEA BUFFER EAST LOCATOR NUMBER: R12 Cove from TD to 13.0".	GROUND ELEVATION (FT): CASING DIAMETER (IN): BOREHOLE DIAMETER (IN):	5728 13 PROJECT NUMBER: 667.11 LOG OF BORING NUMBER: 2 ID GEOLOGIST: LAM 7.25 DATE DRILLED: 09/08/86 3 3 4 4 4
SAP GALL		RECOVERY/ INTERVAL	LELL OR PIZZACTER CONSTRUCTION	UNIFIED SOILS Classification Lithology or rook the	DESCRIPTION
CC SC		0.7 /1.3	0 10	CLAYEY SILTSTON	Dark yellowish brown (10YR 4/2). Highly weathered. Slightly friable. Massive bedding (?), some carbonaceous material. Some iron stains.
		0.9 /0.7	11 11 11 11 11 11 11 11 11 11 11 11 11	CLAYEY SILTSION	Sane as above.
		0.13.70.15	의 12- 다		Some as above, moderately friable.
		0.5 /0.35	n 13	CLAYEY SILTSTON	:Same as above. :Same as above, slightly friable. NOTE: No water encountered while drilling.
			7 14 1 14 1 1	1.2.4 -2.4	
			m 15-		1
			N 16-1 -1 16-1 -1 16-1		
			1 17-1 -1 17-1 -1 17-1 -1 17-1		••
			18-1-18-1 1 18-1 1 18-1		3
			o 19-		

Α-2 M	2011211022200
BOREHOLE NO .: THO 46192	PROJECT NAME: B1 R3 A3 and Landfill Dams Analysis PAGE 1 OF 1
RIG GEOLOGIST: LVS	SUBCONTRACTOR: Woodward-Clyde
DEPTH TO BEDROCK (FD: 74.5'	DEPTH TO WATER TABLE (ED: 24.) DATE: 10/2/92

CLASSIFICATION OF LAYERS

DEPT	H (FT)	SOIL	
FROM	то	SYMBOL	SOIL DESCRIPTION
Θ	5	FILL	GTAVEL ANGULAR TO SUBTROUND, FINE TO COARSE, SANDY, ANGULAR
			FINE TO COATESE SILTY MED PLASTICITY, MOIST BROWN
5	15	FILL	CLAY MEDIUM TO HELD PLASTICITY STIFF TOVERY STIFF SANDY
			FINE TO COATESE, ANGULAR GRAVELLY FINE TO MEDIUM, ANGULAR TO
			SUBTROUND MOIST BROWN
8	24	FILL	CLAY MEDION TO HIGH PLASTICITY STIFF TO VERY STIFF SANDY
		·	FINE, SUBANGULAR ACCREASING TO TRACE @ 20', MOIST BROWN
24	34	cs_	CLAYSTONE, MEDIUM HATED TO YETLY HARD, SLIGHTLY MOIST, DEGREY
	<u> </u>		
			TD@36.0'

CLASSIFICATION OF INDIVIDUAL SAMPLES

				М	OIS	TUI	Œ		G	RA	DI	٧G		В	EDI	ROC	CK		Н	AR	10.	1ES			CC	INC	חכ	10	N		
тор Дерти (FT)	вгож соинт	SAMPLE TYPE	SOIL SYMBOL	DRY	MOIST	VERY MOIST	WET	% SAND	FINE	мергим	COARSE	GRAVEL	% FINES (-#200)	SANDSTONE	SILTSTONE	CLAYSTONE		COLOR	VERY SOFT	SOFT	H	HARDISTIFF	\neg	CEMENTED	MASSIVE	STRATIFIED	POROUS	FRACTURED	CALCAREOUS	отнекѕ	RECOVERY (FT)
<i>O</i> -3	1	BAG	FILL		X			ID	3	3	П	90	10					BROWN								1		\perp			
4.7	24/25	CAL	FILL																												0
6-7	-	BAG	FILL		x			3P	6	0	100	5	彩					BROWN								1					
8.4	8/9	CAL	FILL	Γ	Х			Ø	10				9					BROWN				X									.3
100-33	_	ST	FILL	Γ																											0
14.2	12/13	CAL	FILL																												0
13.5-15.0	_	BAG	FILL	Π	×			10	5	5			90					BROWN			L										
168	9/12	CAL	FILL	Γ	X													BROWN			L	X								DKGER	.2
17-20	_	BAG	FILL	Γ	X				5		Γ		95					BROWN									٠.				
21. D	15/15	CAL	FILL		×													BROWN	L				X			3					3
24.6	11/21	CAL	FILL		X	П			Γ				100			X		DATE PLUE				X									.3
28.6	22/30	CAL				П			T		Γ	T	100	T		X							X								1.3
35.7	35/50	CAL .		1	Γ	П			T	1	1	T	100	,	T	X								X							.3

NOTES: 1. SAMPLE TYPES: SS = 2" O.D. SPLIT SPOON CAL = CALIFORNIA SPOON ST = SHELBY TUBE

2/S = SLIGHT M = MODERATE H = HIGHLY (4075-210)542) (W-C Log Form) (7A492 10-59 AM)

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NOTES: 1. SAMPLE TYPES: SS = 2" O.D. SPLIT SPOON CAL = CALIFORNIA SPOON ST = SHELBY TUBE 2. S = SLIGHT M = MODERATE H = HIGHLY (4035-210-542) (W-C Log Form) (9/4/92 10:59 AM)

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Į į	5	BLOW COUNT	SAMPLE TYPE	SYMBOL	MO	Y MOIST	RE	CAD CAD	GI	IOM	DING	a tives (#200)	% FINES (-#200)	BE	STONE	YSTONE	К	COLOR	H	AR		HARDISILF	VERY HARUSIN	T	T	T	T		T	отнекѕ	RE
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35. 39. 41.8	5 0 3	07B 11/20 13/18 32/100	CAL I	A F F SOLL SYMBOL	DRY	VERY MOIST	RE	% SAND	FINE	IOM	RSE	OCH CHINES (#100)	8 % FINES (#200)	DSTONE	STONE	CLAYSTONE	ek	A LE COLOR	H	AR	DN	HARDISIER	X X VERY HARUSIN	T	T	T	T		T	OTHERS	0 W W
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35. 39. 41.8 42.	5 0 3	078 11/20 13/18 32/1000	CAL I	SOLL SYMBOL	DRY OW	VERY MOIST	RE	% SAND	FINE	IOM	RSE	CONTRACTOR OF THE CANON	(8) (9) (8) (4) (1) (1) (1) (1)	DSTONE	STONE	CLAYSTONE O	ek	AND COLOR	H	AR	DN	HARDISIER	X X VERY HARUSIN	T	T	T	T		T	OTHERS	₩ W W RE
35. 39. 41.8 42.	5 0 3	078 11/20 13/18 32/1000	CAL I	SOLL SYMBOL	DRY OW	VERY MOIST	RE	% SAND	FINE	IOM	RSE	CONTRACTOR OF THE CANON	(8) (9) (8) (4) (1) (1) (1) (1)	DSTONE	STONE	CLAYSTONE O	ek	AND COLOR	H	AR	DN	HARDISIER	X X VERY HARUSIN	T	T	T	T		T	OTHERS	₩ W W RE
35. 39. 41.8 42.	5 0 3	078 11/20 13/18 32/1000	CAL I	SOLL SYMBOL	DRY OW	VERY MOIST	RE	% SAND	FINE	IOM	RSE	CONTRACTOR OF THE CANON	6 6 6 % rutes (#200)	SANDSTONE	SILTSTONE	CLAYSTONE O	ek	AND COLOR	H	AR	DN	HARDISIER	X X VERY HARUSIN	T	T	T	T		T	OTHERS	₩ W W RE
35. 39. 41.8 42.	5 0 3	078 11/20 13/18 32/1000	CAL I	SOLL SYMBOL	DRY OW	VERY MOIST	RE	% SAND	FINE	IOM	RSE	CONTRACTOR OF THE CANON	6 6 6 % rutes (#200)	DSTONE	SILTSTONE	CLAYSTONE O	ek	AND COLOR	H	AR	DN	HARDISIER	X X VERY HARUSIN	T	T	T	T		T	OTHERS	₩ W W RE
35. 39. 41.8 42.	5 0 3	078 11/20 13/18 32/1000	CAL I	SOLL SYMBOL	DRY OW	VERY MOIST	RE	% SAND	FINE	IOM	RSE	CONTRACTOR OF THE CANON	6 6 6 % rutes (#200)	SANDSTONE	SILTSTONE	CLAYSTONE O	ek	AND COLOR	H	AR	DN	HARDISIER	X X VERY HARUSIN	T	T	T	T		T	OTHERS	₩ W W RE
35. 39. 41.8 42.	5 0 3	078 11/20 13/18 32/1000	CAL I	SOLL SYMBOL	DRY OW	VERY MOIST	RE	% SAND	FINE	IOM	RSE	CONTRACTOR OF THE CANON	6 6 6 % rutes (#200)	SANDSTONE	SILTSTONE	CLAYSTONE O	ek	AND COLOR	H	AR	DN	HARDISIER	X X VERY HARUSIN	T	T	T	T		T	OTHERS	₩ W W RE

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NOTES: 1. SAMPLE TYPES: SS = 2" O.D. SPLIT SPOON CAL = CALIFORNIA SPOON ST = SHELBY TUBE

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1-35	BUREHULE LUC
17-27	DOKEHOLELOC

D-37	BOREHOLE LOG
BOREHOLE NO .: TH 046392	PROJECT NAME: B1 R3.A3 and Landfill Dams Analysis PAGE 1 OF 1
RIG GEOLOGIST: LY S	PROJECT NAME: B1, R3, A3, and Landfill Dams Analysis PAGE 1 OF 1 SUBCONTRACTOR: Woodward-Clyde
. DEPTH TO BEDROCK (FT): 41	DEPTH TO WATER TABLE (FT): 32.0 DATE: 10/1/97

CLASSIFICATION OF LAYERS

DEPT	H (FT)	SOIL	
FROM	то	SYMBOL	SOIL DESCRIPTION
Ø	5	FILL	GRAVEL, FINE TO MEDIUM, SUBROUND, SANDY FINE TO COARSE, ANGULAR
		l	SILTY MEDIUM PLASTICITY DIZY BIZOWAL
5	1A At LUS	FILL	CLAY MEDIUM TO HIGH PLASTRITY STIFF VERY STIFF GRAVELY
			FINETO COARSE, SUBANGULAR, SANDY FINETO MEDIUM, ANGULAR TO
			SUBTROUND, MOIST GREY BROWN W/ SOME OLIVE BLACK TAN
14	41	FILL	CLAY STIFFTO VERY STIFF MEDIUM TO HIGHASTICTY, SANDY COARSE TO FILL
			SUBROUND POSUBANGULAR, FRANKFILF, MOIST BROWN GREY OLIVE
			TRALEFILT, SOME FE STAINING TOPSOIL AT 28-29 W/ROUTS
			WATER AT 32.0' POSSIBLE ANHYDRITE IN VOIDS @ 33.00'
41		C5	CLAYSTONE HARD TO VETEY HARD, HIGH PLASTICITY (ShavINGS)
			SLIGHTLY MOIST DARKGREY/BLUE
	1	 	

CLASSIFICATION OF INDIVIDUAL SAMPLES

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тор бертн (FT)	BLOW COUNT	SAMPLE TYPE	SOIL SYMBOL	DRY	MOIST	/ MOIST	WEI	% SAND			COARSE		% FINES (-#200)	3		CLAYSTONE	-11	COLOR	VERY SOFT			HARD\SI IFF	NTED CALL	T	ED			CALCAREOUS	отнекѕ	RECOVERY (FT)
5.7	19/14	ETT-	FILL		X			20	5	5	103	\neg	5ø					3120mm				1	×			L	L		BLAUL	-3
7.9	53/30	CAL	FILL																			\perp	\perp	1	_	L	L			9
11	1	ST	FILL																			\perp		1	\perp	L	L			θ
14	10/10	CAL	FILL																				\perp		_	L	L			Θ
14.7	4/8	CAL	FILL		X			20					80					BROWN	L	Ŀ			\perp		_		L			.3
14-16	_	BAG	FILL		X								(00)					Brown		L		\bot	\perp	1		L	L			2.0
206-226	_	57	FILL	Γ	X		T						(90)					BROWN		L					\perp	L	L	L	مدرو	2.0
23.7	11/19	CAL	FILL		Х		1	10	10				90					TROWN GRBY	L					\perp		L	L	L		.3
28.1	12/14	CAL	FILL		k	П						٦	100	Γ		·		BLACK		L						L	L		ROOTS	.3
32.5	10/13	CAL	FILL	Γ	×		\exists						100	Γ				BLACK							L	1			WATER	.3
36.7	24/9	cA'L	FILL	Γ	×	-		20	Γ	20	П		80	T				BROWN										L		.3
40.7	18/33	CAL	cs		*		7		Γ		П			T		χ		GREY/BLM	1	T		П	T	T						.3
	1-11	CAL	cs	Ť	1		1		T					T	Γ	X	Γ	CROVBLE	Т											.3

NOTES: 1. SAMPLE TYPES: SS = 2" O.D. SPLIT SPOON CAL = CALIFORNIA SPOON ST = SHELBY TUBE

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BOREHOLE LOG

BOREHOLE LOG

BOREHOLE NO.: TH046492 PROJECT NAME: B1, R3, A3, and Landfill Dams Analysis PAGE 1 OF 1

RIG GEOLOGIST: Michael May SUBCONTRACTOR: Woodward-Clyde

DEPTH TO BEDROCK (FT): 14.0 DEPTH TO WATER TABLE (FT): NE DATE: 10-26-92

CLASSIFICATION OF LAYERS

DEITI	H (FT)	SOIL	
FROM	OT	SYMBOL	SOIL DESCRIPTION
0	4	Fill	Gravel, fine to coarse, angular to subround, sandy, fine
			to medium grained, angular to subangular, clay, low
			plasticity, medium dense, moist, brown, lightgray, black.
4	14	Fill	Clay, medium to high plasticity, sandy, fine tomedium
			grained, angular to subangular, moist, light gray,
			dark gray, brown.
14	19.5	CS	Claystone Bedrock, low to medium plasticity, sandy
			fine grained, angular to subangular, moist, light
			gray, dark gray, brown, hard.
			3 /-

CLASSIFICATION OF INDIVIDUAL SAMPLES

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	тор рертн (FT)	BLOW COUNT	SAMPLE TYPE	SOIL SYMBOL	DRY	MOIST VERY MOIST	VEKT MOIST	% SAND	FINE	МЕДІИМ	COARSE	GKAVEL	% FINES (-#200)	SANDSTONE	SILTSTONE	CLAYSTONE		COLOR	VERY SOFT	SOFT	FIRM	HAKU VEDV UADD		MASSIVE	STRATIFIED	POROUS	FRACTURED	CALCAREOUS	OTHERS	RECOVERY (FT)
		610	Ca	Fill		X		3Φ		$\langle $	-	90	3Ø					Brown L.Gray							\perp				Black	
T	4	8/18	Cal	Fill		X		10					90					L.Gray						_	$oldsymbol{\perp}$					Φ
	7	5/8	Cal	Fill		X		10	X				90					Brown Gray					\perp		\perp				L. Gray	.3
	0-5	NA	Bucket	Fill		X	Mix	1-0	e	0	7	d	lay	2	4	رو	_ [elan		s.	2	d	$\sqrt{}$	<u>d</u>	lb.	<u>\</u>				AΑ
	9	25 50/5"	Cal	Fill		X		30					70		Ä	$\overline{\mathbb{N}}$	d	ocki	h	2	يا	راي	-	li	Μć	<u>}</u>	上			0
	5-10	NA	Bucket	Fill		X		20					80					Brown				\perp				_				AM
	13	35 50/5"	Cal		5	X		10	X				90					Brown Gray L.Gray D.Gray							$oldsymbol{\perp}$				Brown	.3
	19	17/50	Cal	CS		X		10	X				9Φ			X		D.Gray Brown				X				L	L			.3
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BOREHOLE NO.: 7404692 PROJECT NAME: B1,R3,A3, and Landfill Dams Analysis PAGE OF 2

RIG GEOLOGIST: LVS SUBCONTRACTOR: Woodward-Clyde

DEPTH TO BEDROCK (FD): 250 DEPTH TO WATER TABLE (FT): 20.6 * DATE: 10/7/92

CLASSIFICATION OF LAYERS

			CLASSITICATION OF ZATIZATE
DEPT	I (FT)	SOIL	
FROM	TO	SYMBOL	, SOIL DESCRIPTION
0	7	FILL	CLAY MEDIUM PLASTICITY, SANIDY, FINE SUBROUND, DE SLIGHTLY
			MOIST, BROWN, GIREY, BLACK, WHITE, TRACEFE, TRACEGRAVEL, COATESE
			SURROUND, STIFF
7	15.5	FILL	CLAY MEDION TO HI PLASTICITY STIFF, SANDY FINE SUBROUND
			MOIST, BROWN GREY, IRON STAINING
155	2Ø	FILL	CLAY HIGH PLASTICITY, STIFFTO VERLY STIFF, MOIST BROWN GITEY
			BLACK
20	25	FILL	SAND/GRAVEL, WELLGRADED, FINE TOCOATESE ANGLAR TO
			SUBROUND, VERYWET, BROWN
25	26	C5	CLAYSTONE BEDROCK, MEDIUM HARD TO HARD, MOIST GIREY
			Brown i Ronst AINING
			LVS

CLASSIFICATION OF INDIVIDUAL SAMPLES

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тор рертн (FT)	BLOW COUNT	SAMPLE TYPE	SOIL SYMBOL	DRY	MOIST	VERY MOIST	WEI	% SAND	FINE	меріим	COARSE	GKAVEL	% FINES (#200)	SANDSTONE	SILTSTONE	CLAYSTONE		coroi	VERY SOFT	SOFT	ľ	HARD STIEF	-	MASSIVE	STRATIFIED	POROUS	FRACTURED	CALCAREOUS	OTHERS	RECOVERY (FT)
3.7	8/9	CRL	FILL	*			2	Φ	X				80					CIREY DILEUM	_			\downarrow	4	4	1	\downarrow	\downarrow	+	BLACK	.3
4.9-6.9	-	ST.	FILL	*			2	30	×		_	7	70					CIREY	_			\dashv	4	4	1	╀-	+	-	white Fe	-
0-5	_	BKT	FILL				1	25	x				75					44	_			\perp			1	1	1	_		
8-10	_	ST	FILL		X			15	×				85					BROWN								\perp	\perp	\perp	Fe	1.5
u·2	6/10		FILL		×		7	10	×			٦	90		Γ			BROWN		-									Fe	.3
	-	BKT	FILL	П	X		+	Ю	K				90	Γ	Π		Γ	"											"	_
5-10			 		×			5	k				e 5	1	╁	 	T	BRELLW	T	Γ		П	٦	T	T				Fe	2
13.5-15.5	2/	<i>5</i> 7	FILL	-			+		-	-		_	100	1	\dagger	╁╴	\dagger	BROWN	T	T	Γ	K	7	\exists	T	T	T	T		.3
16.2	8/13	CAL	FILL	-	X	1-1	\dashv		\vdash	-		-		+	╁	┢	╁	Brown	╁	\dagger	一	1	H	十	十	1	\top	\top		_
10-15		BKT	FILL	_	X	1	_		┨_	-	-	_	1000	+	╀	╀	╁	GREY	┼	十	╁	Н	\dashv	\dashv	十	十	十	十	1	2
182-20.2	STLVS	ST	FILL	_	_	X	\bot		$oldsymbol{ol}}}}}}}}}}}}}}$	_		_	1000	1	\downarrow	╀-	\downarrow	BLACK	+	╀	-	\vdash	\vdash	\dashv	+	+	\dashv	╁	Sw	1
视力	8/10	CAL	FILL				×	1000	107	17	17	50		_	1	_	1	Brown	1	4	1				4	4	+	+	(14)	
25.7	18/30	CAL	c5		X								100		\perp			CLEA Bro my	\perp		X	X			4	4	4	4	 	1.3
15-20	10 m	BKT .	FILL		×	×							ioxi					BLACK	1					Ц		\perp				

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T-TRACE

* - TOE/LATERAL DRAIN

BOREHOLE LOG

			T): 25 DEPTH TO WATER TABLE (FT): 2.0° DATE: 10/6/12
			CLASSIFICATION OF LAYERS
DEPT FROM	H (FT)	SOIL SYMBOL	SOIL DESCRIPTION
26	32	c5	CLAYSTONE, HARD MOIST, BROWN, CREY
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 	 		1.17
 	 		LVS
	 		
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тор ВЕРТН (FT)	вгож соимт	SAMPLE TYPE	SOIL SYMBOL	DRY	MOIST	VERY MOIST	WEI	% SAND	FINE	меріим	COARSE	GRAVEL	% FINES (-#200)	SANDSTONE	SILTSTONE	CLAYSTONE		COLOR	VERY SOFT	SOFT	FIRM	HARD	VERY HAKU	MASSIVE	STRATIFIED	POROUS	FRACTURED	CALCAREOUS	OTHERS	RECOVERY (FT)
30.7	22/30	CAL	C5	T																			\perp	1	1	\perp	\downarrow	\sqcup		0
	25/34	CAL	cs	T	X	\Box	1						1000			X		FROUNT CITEY				X	\perp	\perp	_	_	1			-3
31.7	25/37	CAR		\dagger	T		寸																\perp	\perp	\perp	_	$oldsymbol{\perp}$			
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L	CAL - CAL FORMA SPOON ST = SHELBY TUBE																													

NOTES: 1. SAMPLE TYPES: SS = 2" O.D. SPLIT SPOON CAL = CALIFORNIA SPOON ST = SHELBY TUBE

2. S = SLIGHT M = MODERATE H = HIGHLY (4035-210-542) (W-C Log Porm) (9/4/92 10:59 AM)

* - TOE DEAIN

B- 1 5W ream side BURLHULE LUG

BOREHOLE NO .: THOA 6692	PROJECT NAME: B1, R3, A3, and Landfill Dams Analysis PAGE 1 OF 3 SUBCONTRACTOR: Woodward-Clyde
RIG GEOLOGIST: LVS	subcontractor: Woodward-Clyde
DEPTH TO BEDROCK (FT): 27-1 NE	0 ~ '-16102

CLASSIFICATION OF LAYERS

			CEMBER TOTAL CALLED
DEITI	1 (FT)	SOIL	
FROM	OT	SYMBOL	, SOIL DESCRIPTION
0	3.5	FILL	GRAVEL FINE TO COARSE, ANGULAR TO SUBPOUND, CLAYEY
			HIPLASTICITY, MOIST, BROWN
3.5	7.0	FILL	CLAY HIGH PLASTICITY GRAVELLY FINE TO MEDIUM, SUBANGULAR
			TO SUBTROUND SANDY FINETO COATESE, ANGULAR TO SUBTROUND
			MOIST BROUNE BLACK
7.0	17.Φ	FILL	CLAY HI PLASTICITY, SLIGHTLY WET TO WET, STIFF, GREY TO
			DARK GREY, TRACE TROOTS, 10-20% SAND, FINE @ 17
17.0	27.1	FILL	CLAY GRAVEL 50% CLAY 50% GRAVEL CLAY HIPLASTICITY
			GRAVEL SUBANGLAR TO SUBROUND COARSE VERYWET, BLACK/DARILGIET
			LVS

CLASSIFICATION OF INDIVIDUAL SAMPLES

				M	OIS.	TUI	2 E		G	2 Δ 1	DIN	G	1	RI	EDF	ROCI	ĸ		H	AR	DN	ES	s	,	CO	INC	ЭΠ	10	N		
тор Дертн (FT)	BLOW COUNT	SAMPLE TYPE	SOIL SYMBOL		MOIST	AOIST	WET	% SAND				GRAVEL	% FINES (-#200)	3		CLAYSTONE		COLO	VERY SOFT			出		CEMENTED	MASSIVE	STRATIFIED	POROUS	FRACTURED	CALCAREOUS	OTHERS	RECOVERY (FT)
4.4	7/8	CAL	FILL		ķ			10	х				90				\perp	DEPOY CITEY				X	_	4		\dashv			4		.3
5.07.0	_	ST	FILL		X			10	-	10	-	8	70					BLACK					_	_	_	_	_				2
0-5	-	BKT	FILL	Γ	x								100					BROWN													
7.3.9.3	-	57	FILL	Τ	X	x							100	Γ				BROWN	_												2
5-10	_	BKT	FILL		1-	x							1000	Γ		П		BROWN DL KEFY			4.										
110	7/10	CAL	FILL	一	٦		X	10	0				蜀					DARK GREY													.3
12-14	-	-ST	FILL		Γ		×		Γ			Г	150	Π				PARKUTT	_												2
14.74	7/8	CAL	FILL	T	T		X		Γ				100	T	T			CIREY PO									_				.3
15-17	-	ST	FILL	T	T		×		Γ	Γ	Γ	Γ	100					DARK GREY													2
10-15		BLT	FILL	T	十	T	×		Γ		Γ	T	100	Τ	T	П		CITE	Γ								!				_
	6/9/12/13		FILL	十	十	T	X	20	×			Γ	820	T	T	П		DARK	T	T	T		Γ	Γ							.3
	17)1413 —	CAL		+	T	\dagger	 _	30	1	1	10	-		+	1	$ \cdot $		BLACK	T	T	T	Γ		Γ	Γ						2
20-22	15/30	ST CAL	FILL	+	\dagger	\dagger		-		ľ	1	1-	50	\dagger	\dagger	$\dagger \dagger$	<u> </u>	BLACE	T	T	T										0

NOTES: 1. SAMPLE TYPES: SS = 2" O.D. SPLIT SPOON CAL = CALIFORNIA SPOON ST = SHELBY TUBE

2. S = SLIGHT M = MODERATE H = HIGHLY (4035-210-542) (W-C Log Point) (74472 10:39 AM)

BOREH	OLE NO).: <u>T</u> J 0	0466°	9 Z			PI	ROJ	EC	TN	HUI AME	B	,B	3,1	13	and La	nd! We	النة 200	D=	ims Ia	s A.	<u>nal</u> -	ysi:	spa Ty	4GI	е_ е_	<u>2</u> OF	<u>3</u>
DEPTH	TO BEI	OROCK (FT): _	7	ε		D	EP.	ПН	то	WAT	ER	TA	BLI	Ξ (1	FT):	8 .	9			DA	TE	<u>:</u> _	7	10	0/6	6/92	
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DEPT	H (FT) 70	SOIL SYMBO										OII	חב	:c^!	210	TION	-											
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EPTI	V COUNT	PLE TYPE	SYMBOL		r MOIST		Ð		Σ	SE	ES (-#200)	STO	TONE	STON		æ	r SOFT			HAR	E	IVE	TIFE	US	IZ F	AKE	RS	VER
TOPD	вгом	SAMP	SOIL S	DRY	VERY	WET	% SAI	뿔	EDI	COARSE	% FIN	AND	SILTSTONE	LAY		COLOR	VERY	SOFF	FIRM	HAKU VERV	EME	AASS	TRA	ORO	FRACTURED	ALC	OTHERS	RECOVERY (FT)
15-20	-		FILL		<u> </u>	X	6	11-	≥	00	100	1	S	O	1	DEGREET BLAUL	_	S			10	=	5	Ь		7	0	-
23.7	8/17	CAL	FILL			х				5	50					DAR IL CIREY			1	1	I	I				I		.3
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NOTES: 1. SAMPLE TYPES: SS = 2" O.D. SPLIT SPOON CAL = CALIFORNIA SPOON ST = SHELBY TUBE 2. S = SLIGHT M = MODERATE H = HIGHLY (4035-210-542) (W-CLog Form) (9/4/92 10:59 AM)

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BOREII	OLE NO).: <u>TILO</u>	PROJECT NAME: BI, R3, A3, and Landfill Dams Analysis PAGE 3 OF 3
RIG GE	OLOGIS	T:	subcontractor: Woodward-Clyde
DEPTH	TO BED	ROCK (F	T): 77 DEPTH TO WATER TABLE (FT): 8 DATE: 10/7/92
			CLASSIFICATION OF LAYERS
DEPTI FROM	H (FT) TO	SOIL SYMBOL	, SOIL DESCRIPTION
27.1	36	CS	CLAYSTONE, HARDTO VERY HARD, MOIST TO VERYMOIST, GREY TO
			CLAYSTONE, HARDTO VERY HARD, MOIST TO VERYMOIST, GREY TO DATEK GREY & BROWN
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			21/5

CIA	SCILLO	MOITA	UE INDI	VIDIIAI	SAMPLES	
CLA		MULL	OF HADI	YIDUAL	OWINTER	,

				М	OIS	sTU	RE		G	RA	DI	NG		В	ED	RO	СК		H	ΙΑF	ED!	VES	ss	,	CC	NC	DΓ	пс	N		
тор DEРТН (FT)	BLOW COUNT	SAMPLE TYPE	SOIL SYMBOL	DRY	MOIST	VERY MOIST	WET	% SAND	FINE	MEDIUM	COARSE	GRAVEL	% FINES (#200)	SANDSTONE	SILTSTONE	CLAYSTONE		COLOR	VERY SOFT	SOFT	FIRM	HARD	VERY HARD	CEMENTED	MASSIVE	STRATIFIED	POROUS	FRACTURED	CALCAREOUS	OTHERS	RECOVERY (FT)
27.9	24/36	CAL	cs		X								100			K		GREYA				X									.3
31.7	30/50	CAL	cς			X			T				100			K		GREY	1	Γ		П	X	7							.3
34.7	30/50	CAL	cs			X			Γ	Γ			100	Γ	Γ	X	П	DATEL	Γ			П	X								•3
20-25	1	BKT	FILL	Γ		X	x			Γ	Γ		100		Γ		П	DARK	Γ			П		T							-
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NOTES: 1. SAMPLE TYPES: SS = 2" O.D. SPLIT SPOON CAL = CALIFORNIA SPOON ST = SHELBY TUBE

2. S = SLIGHT M = MODERATE H = HIGHLY

(4005-210-542) (W-C Log Form) (74492 10-59 AM)

B-1 Toe

BOREHOLE LOG

BOREHOLE NO.: THO 467	792	PROJECT NAME: BI R3.A3 and L	andfill [ams Analysis PAGE 1 OF 1
RIG GEOLOGIST: Mike Mi	av	SUBCONTRACTOR	: Wood	ward-Clyde
DEPTH TO BEDROCK (FT):	7 7	DEPTH TO WATER TABLE (FT):		.4 00 00

CLASSIFICATION OF LAYERS

DEIT	H (FT)	SOIL	•
FROM	OT	SYMBOL	SOIL DESCRIPTION
Φ	2	Fill	Gravel, fine to coarse, angular to subround, sandy,
			fine to medium grained, angular to subangular,
			medium dense dry to moist, brown.
2	14.0	Fill	Clay, Low to medium plasticity, sandy, fine to
			medium grained, angular to subangular, stiff to
			very stiff, moist, brown, gray, dark gray, iron
			staining a lock
14.0	19.7	CS and	Sandstone, fine to medium grained, subangular to
			subround, clayey, moist, brown, dark gray, iron
			oxide staining, very hard
			Claystone Bedrock, sandy, fine to medium grained,
			subangular to subround, very hard, moist, brown,
			gray, dark gray.

CLASSIFICATION OF INDIVIDUAL SAMPLES

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тор дертн (гт)	BLOW COUNT	SAMPLE TYPE	SOIL SYMBOL		MOIST	VERY MOIST WET	% SAND	FINE		COARSE		% FINES (-#200)	3		CLAYSTONE	~	VERY SOFT			HARD		MASSIVE	STRATIFIED	POROUS	FRACTURED	CALCAREOUS	OTHERS	RECOVERY (FT)
	6/16	Cal	Fill				30			4	Ø.	3φ				Brown						\perp	L					.3
3	AN	ST	Fill		X		20				T	80				Brown	Γ											1.Φ
4.5	8/15	Cal	Fill		X		20		X	2	4	60				Brown												.3
Ø-5	AN	Bucket	Fill	П	X		20			_	pl'	2Φ				Brown		-			\top							NA
9	410	Cal	Fill	П	X		10					90				Brown,	Γ				T	T	T					.3
5-10	AN	Bucket	Fill		X		20			\sqcap	_	80	+			Brown, Gray, Black Brown, Gray, Black					T	T		Τ				AM
13	9/28	Cal	Fill		X		10	X	-		_	90				Brown		Γ		П	T	T	T					.3
10-15	AN	Bucket			X		10	X				90	T			Brown					T	T	T					AN
16	27	(2)	CSand		X		10 80			H	7	90 20	V		X	Brown		Γ	Π		X	1	T	1				.3
19	40 / 503°	Cal	CS and SS CS and SS		X		80			H	7	30 20	X		X	Brown D. Grav		Γ			X	T			Γ		Fe Oxide Staining	.3
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U5 8-35 Coust BOREHOLE LOG

BOREHOLE NO .: THO 46892	PROJECT NAME: B1, R3, A3, and Landfill Dam subcontractor: Woodwa	SAMPSISPAGE 1 OF Z
RIG GEOLOGIST: LVS	SUBCONTRACTOR: WOODWE	ird-Clyde
	DEPTH TO WATER TABLE (FT): NE	DATE: 10/13/92

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!		_	CLASSIFICATION OF LAYERS
DEPTI FROM	I (FT) TO	SOIL SYMBOL	SOIL DESCRIPTION
0	1	FILL	GRAVEL, FINE TO COARSE, ANGULAR TO SUBANGULAR DRY, BUE
1	9	FILL	CLAY STIFF LOW TO MEDIUM PLASTICITY, DANDY, TINE TO
			MEDIUM ANGULAR SLIGHTLYMOIST BROWN TO DARK DROWN
10	21	FILL	CLAY STIFF TO VERY STIFF, HIGH PLASTICITY MOIST TO VEICE
			MOIST DARK GREY DARKBROWN, LIGHTGREY BLACK, TRACE
			CONTRACTO SOME FOOTS /L4 TO /B
21	26.5	55	SOMETTIME BEDROCK HARD TO VERY HARD CLASS (1570)
			FINEGRAINED, ANGULAR CLAYEY (25%) SLIGHTLY MOIST
			BROWN TOTANTOGIZEY, SOME ITZON CONCRETIONS
	-		
	<u> </u>	 	243

CLASSIFICATION OF INDIVIDUAL SAMPLES

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	тор Dертн (FT)	BLOW COUNT	SAMPLE TYPE	SOIL SYMBOL	DRY	MOIST	7 MOIST	WET	% SAND	FINE	меріим	COARSE	GRAVEL	% FINES (-#200)	SANDSTONE	SILTSTONE	CLAYSTONE		COLOR	VERY SOFT	SOFT	FIRM		VERY HARD	CEMENTED	CTP ATTENT	POROUS	FRACTURED	CALCAREOUS		OTHERS	RECOVERY (FT)
1		8/12	CAL	FILL	_	1 3			40	20	20			60					BROWN	_	_	_		4	4	-	+	\downarrow	+	┞		ξ.
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	6	6/7	CAL	FILL																_	_	Ļ		_	\dashv	4	+	+	+	╀		0
		5/6	CAL	Fiu	Γ	X			25	20		5		75		L			BROWN	1_	1	<u> </u>			\dashv	_	+	+	+	╀		3
1	P-5		BKT	FILL	Γ	*			20	4-	20	-		80		L		L	BROWN	<u> </u>	_	<u> </u>			\dashv	4	+	+	+	\dotplus		↓
T	11	4/5	CAL	FILL		1	k							100			_	_	CREY	\perp	1	_			_	4	\downarrow	+	+	\dotplus		3
1	2-14	~	ST	FILL	T	X								100	1	_	<u> </u>	_	BLACK	_	1	1	_			\dashv	\dashv	+	+	\dotplus		
-	5-10	-	BKT	FILL	T	X			5	5				95					GRAY	_	\perp	1	_			4	4	4	+	+		-
1	4-15	_	ST	FILL	T	X								100					CINEY	_	1	1	<u> </u>			_	\dashv	,-}	\bot	\downarrow		
- 1	15	417	CAL	FILL		×			15	15				85					BLACK	1	_	1	1					4	+	+		1.3
1	10-15	_	BILT	FILL	1	×	1	Γ		T	1	T		120					BROWN	1	\perp	1	\perp					_	4	4		1=
-	15-17	_	ST	FILL	+	1x	-				T	1	T	100	, [CREY		1	1	_	_			Ц	_	\downarrow	\downarrow		4"
-	17	7/11	CAL	FILL		7	1		20	þ.	p			80					GREY		_			L			\sqcup			_		1.1

BOREHOLE LOG

):: THO		PROJECT NAME: B1, R3, A3, and Landfill Dams Analysis PAGE 2 OF 2 SUBCONTRACTOR: Woodward-Clyde
RIG GEO	DLOGIS	T:	.٧5	subcontractor: Woodward-Clyde
DEPTH'	TO BED	ROCK (F	n: 21	DEPTH TO WATER TABLE (FT): NE DATE: 10/13/92
				CLASSIFICATION OF LAYERS
DEPT	H (FT)	SOIL		
FROM	TO	SYMBOL		' SOIL DESCRIPTION
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CLASSIFICATION OF INDIVIDUAL SAMPLES

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	тор бертн (FT)	BLOW COUNT	SAMPLE TYPE	SOIL SYMBOL	DRY	MOIST	VERY MOIST	WET	% SAND	FINE	MEDIUM	COARSE	GRAVEL	% FINES (-#200)	SANDSTONE	SILTSTONE	CLAYSTONE		COLOR	VERY SOFT	SOFT	FIRM	HARD	VERY HARD	CEMENIED	CTP ATTEIED .	POROIIS	FRACTURED	CALCAREOUS	OTHERS	RECOVERY (FT)
l	19	10/11	CAL	FILL		×	X					5		95					CREY						1	\perp		\perp			-3
	15-20	-	BLT	FILL		×	х					5		95					DARL												-
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	21	25/30	CAL	55		k								25	X								አ	X			T	T		/Pow	.3
I	25.5	26/50	CAL	55		K								25	×							~	X	Х	\sqcap	. [1	T		1,2011	.5
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NOTES: 1. SAMPLE TYPES: SS = 2" O.D. SPLIT SPOON CAL = CALIFORNIA SPOON ST = SHELBY TUBE

2. S = SLIGHT M = MODERATE H = HIGHLY (4035-210-542) (W-C Log Form) (9/4/92 10:59 AM)

B-3 C-15th BUREHOLE LOG

BOREHOLE NO.: THO 46992 PROJECT NAME: BI, R3, A3, and Landfill Dams Analysis PAGE 1 OF 2

RIG GEOLOGIST: LVS SUBCONTRACTOR: Woodward-Clyde

DEPTH TO BEDROCK (FT): 25 DEPTH TO WATER TABLE (FT): 20 DATE: 10/12/92

CLASSIFICATION OF LAYERS

			CEASSII TENTION OF ENTERE
DEPTI	H (FT)	SOIL	
FROM	70	SYMBOL	SOIL DESCRIPTION
Ø	2.5	FILL	CHRACKE FINE TO COARSE MERY ANGULAR (BROKEN) TO SUBTROUMIN
			CLAYEY MEDIUM PLASTICITY DRY TO SLIGHTLY MOIST BROWN
			DATLK GITEY
2.5	13	FILL	CLAY STIFF TO VERY STIFF, MEDIUM PLASTICITY SANDY
			FINE TO COARSE ANGULAR TO SUBROUND, DRY TO SLICHTLY MOIST,
			BROWN (IREY
13	25	FILL	CLAY, STIFF TO VEREX STIFF HIGH PLASTICITY, MOIST TO VERLY MOIST,
			DARKGREY, FRAGE GREENGREY, BLACK, BROWN, SOMEGRAVEL 21-2
25	31	m5	SILTSTONE VERY HARD, SLIGHTLY MOIST, BROWN TO DARK BLUE
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CLASSIFICATION OF INDIVIDUAL SAMPLES

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тор DEРТН (FT)	BLOW COUNT	SAMPLE TYPE	SOIL SYMBOL	DRY	MOIST	VERY MOIST	WET	% SAND		MEDIUM		GRAVEL	% FINES (-#200)	SANDSTONE	SILTSTONE	CLAYSTONE		COLOR	VERY SOFT	SOFT		HARD/STIFF		MASSIVE	STRATIFIED	POROUS	FRACTURED	CALCAREOUS	OTHERS	RECOVERY (FT)
2	29/18	CAL	FILL	X				20	æ			Æ.	80 0					BISONA DOUGHER	_			\perp	1	\downarrow	1	_	L	\sqcup		1.3
4	4/13	CAL	FILL	1	*			æ.	9				90					BROWN	L			\perp	4	_	\perp	_	L			-3
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6	5/18	CAL	FILL	1	k			30		L O	.0		70					Brown							\perp		<u> </u>		<u>. </u>	-3
5-10		BILT	FILL		×			90	Γ	Γ	100		90					BIZOWA		ا.		_	1	_	1	$oldsymbol{\perp}$	L	_		1=1
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13-15	_	ST	FILL	Τ	X					Γ		Γ	100p	Τ				DARK				Ц	\perp			_	\perp	$oldsymbol{ol}}}}}}}}}}}}}}}}}}$		8
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17-19	_	57	FILL	T	×	k	Γ		Τ	T			100	T				CREEN K						\perp		1	$oldsymbol{\perp}$	1		ъ"
20	46	CAL	FILL		T	X			T	T	T	iJ	100	T	T	Τ		DOLEVE	1		X	X						1	<u> </u>	
15-20		BKT	1	1-	+	X	1		T	T		100						1			X	K				\perp				

BOREHOLE LOG

D 0 D E 11/	OLE NO	Tuo	DROTECT NAME-RI RS AS and I and fill Dams Analysis PAGE ZOF	<u>Z</u>
BOREHO	OLE NO).: <u>/H@</u>	PROJECT NAME: B1, R3, A3, and Landfill Dams Analysis PAGE ZOF. SUBCONTRACTOR: Woodward-Clyde	
RIG GEO	DLOGIS	1:): 25 DEPTH TO WATER TABLE (FT): 20 DATE: 10/12/92	
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			CLASSIFICATION OF INDIVIDUAL SAMPLES	T
			MOISTURE GRADING BEDROCK HARDNESS CONDITION	1
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Р ОЕРТН (FT)	OW COUNT	MPLE TYPE	IL SYMBOL IL SYMBOL IX IST RY MOIST SAND SAND VE SOLOR SAND NDSTONE CAYSTONE CAND SRACTURED SRACTURED SRACTURED ALCAREOUS	ECOVERY (FT)
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тор регтн (FT)	вгож соинт	SAMPLE TYPE	SOIL SYMBOL	DRY	MOIST	VERY MOIST	WET	% SAND		MEDIUM		GRAVEL	% FINES (-#200)	SANDSTONE	SILTSTONE	CLAYSTONE			VERY SOFT	SOFT	FIRM	HARD	VERY HARD	CEMENIEU	CTRATIFIED	POROIIS	FRACTURED	CALCAREOUS	OTHERS	RECOVERY (FT)	
21-23	-	57	FILL	Π	1	x						15	e 5					CITEDY						\perp	\perp		1	_	<u> </u>	8'	
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2		上山	101	lay, high plasticity, some sand, fine grained, angular to subangular, stiff, moist to wet,																							
	ļ		<u></u>	angular to subangular, stiff, moist to wet, brown, dark gray, black																							
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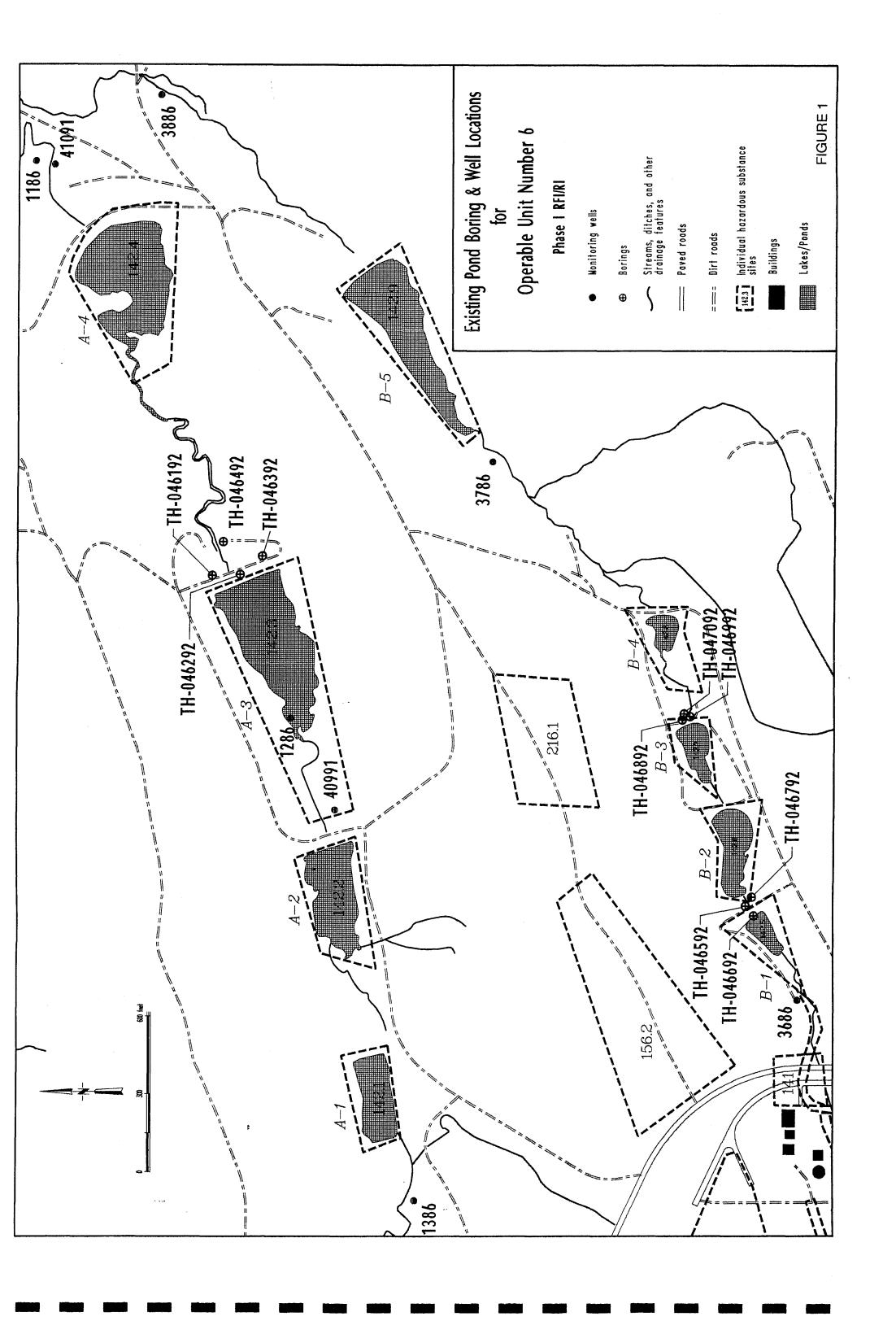


FIGURE 2

FIGURE 3